

Nokia Customer Care

6(a) - Baseband Troubleshooting and Manual Tuning

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Introduction

This document describes in overview the different hardware error possibilities for the RM-14 phone.

Not every possible hardware error is described in this document, but only those possible to correct.

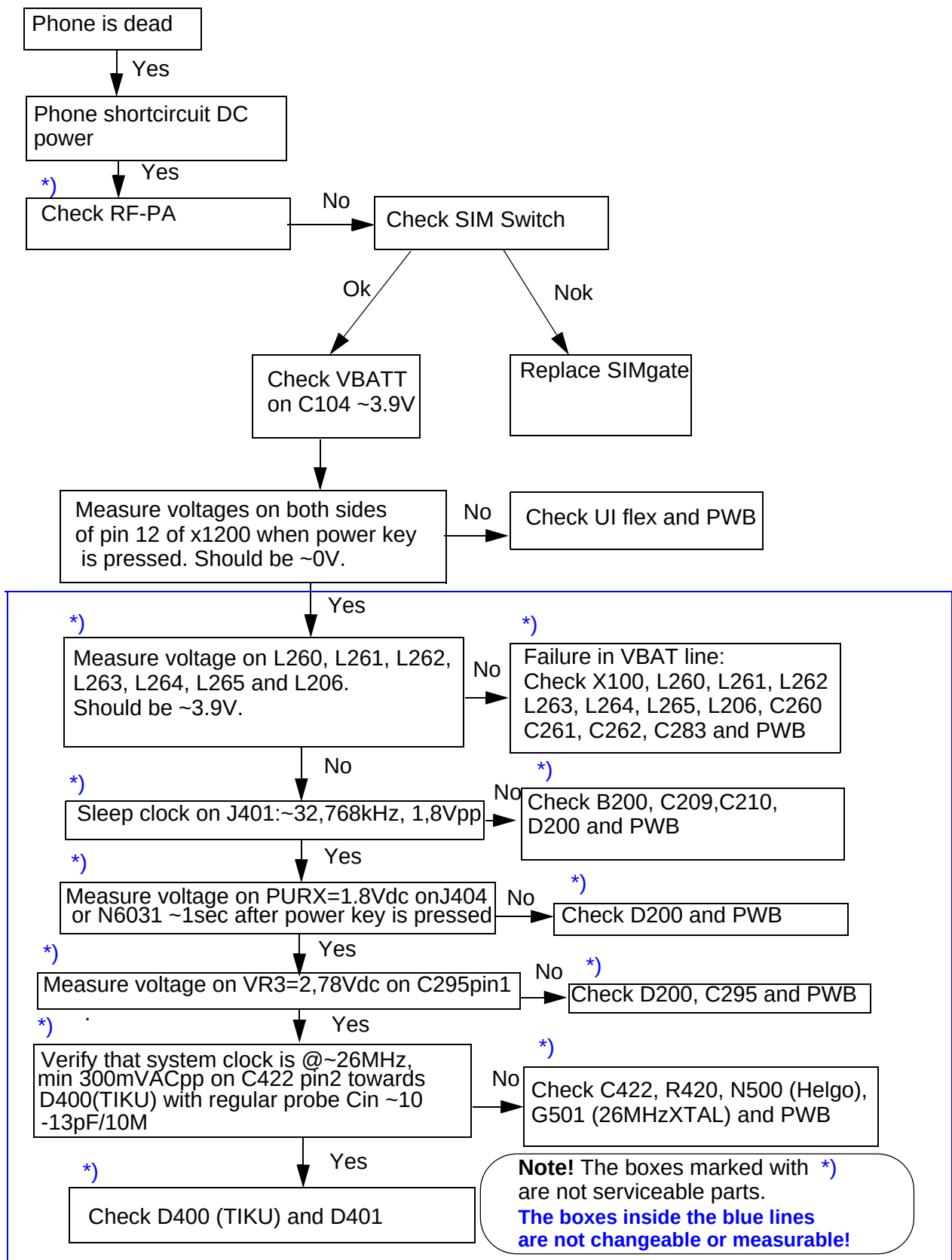
Note! Most components are under shielding and therefore not changeable.

General Failures

■ Phone is dead

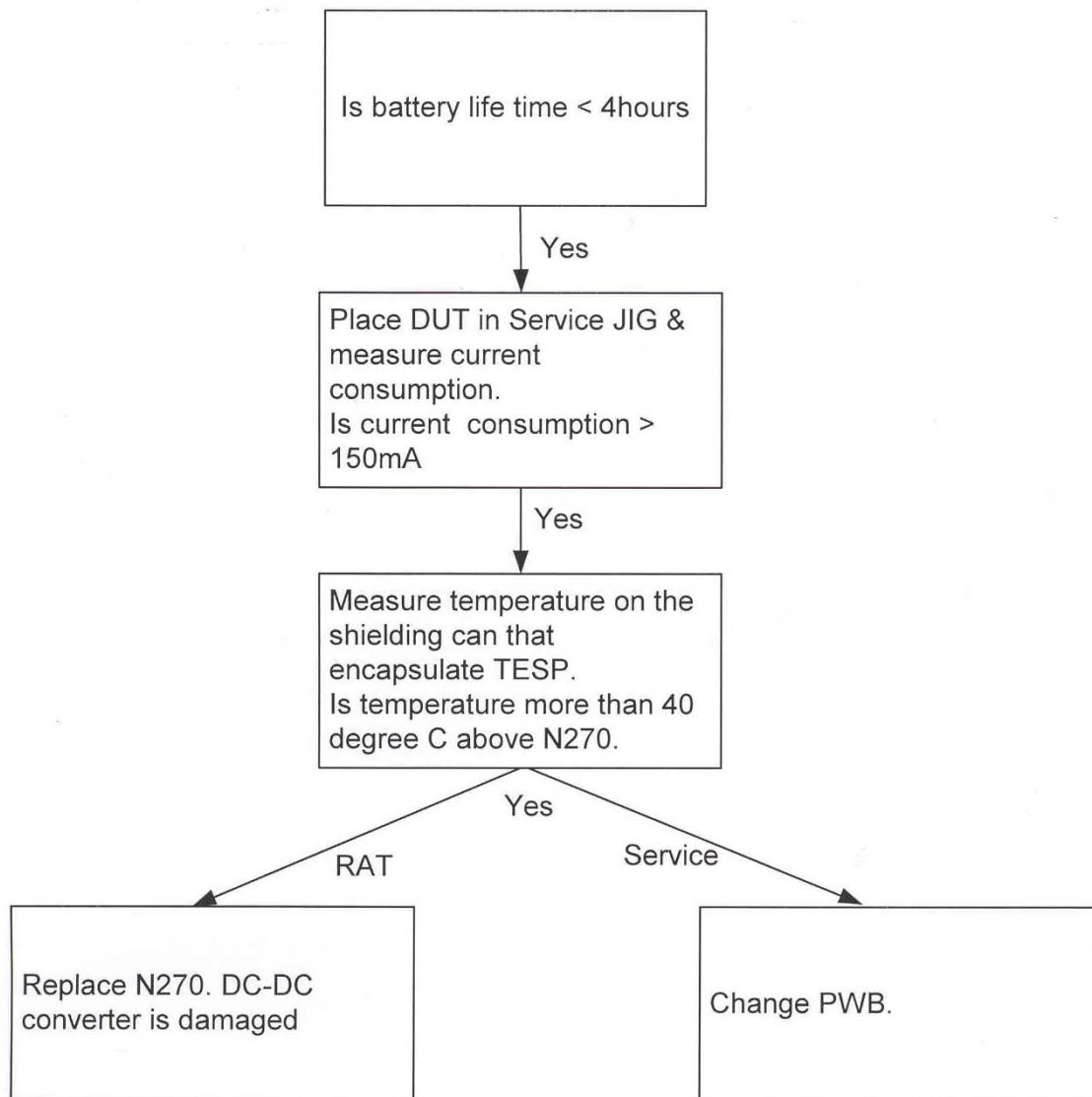
The phone doesn't use any current at all when the supply is connected and/or power key is pressed. It is assumed that the voltage supplied is 3,9Vdc. UEME will prevent any functionality at battery/supply levels below 2,9Vdc and the software will shut the phone down at 3,1Vdc.

Figure 1:Phone is dead



■ Low battery operation time

Figure 2:Low battery



Flash programming does not work

The flash programming on RM-14 boards is possible via the pads on the PWB and through the SIM slide.

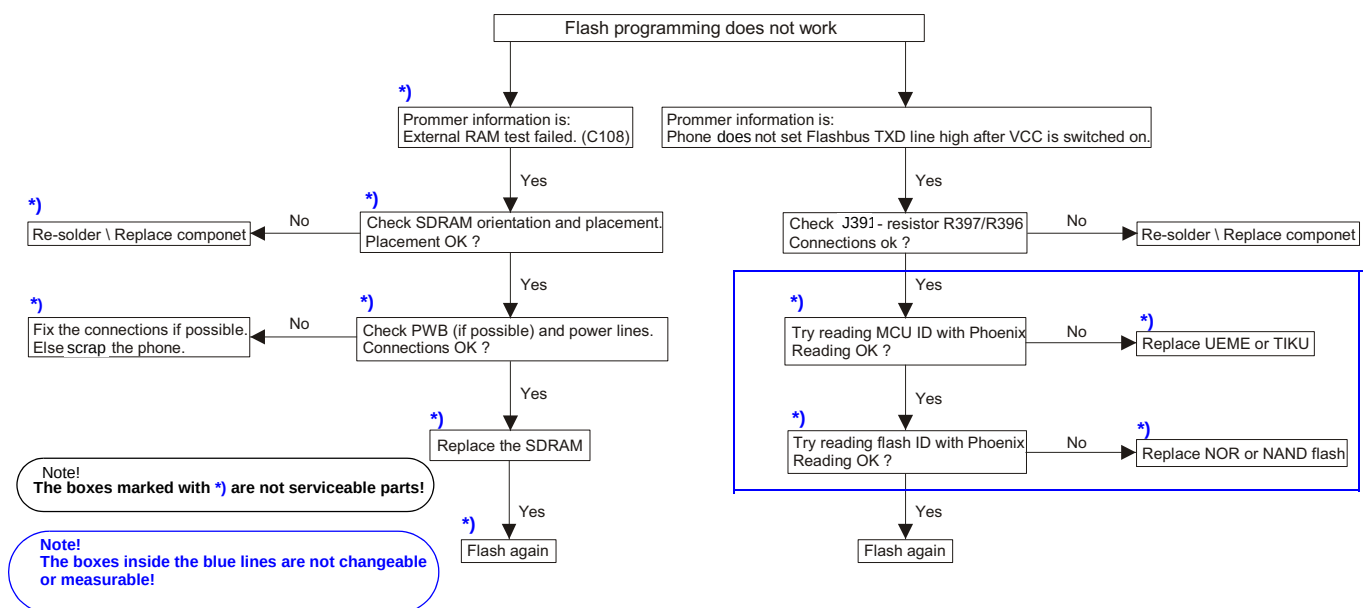
In flash programming error cases the flash prommer (via Phoenix or Darium) can give some information about the fault. The fault information messages could be:

- Phone doesn't set Flashbus TXD line high after VCC is switch on.
- External RAM test failed.

These errors are some of the most common errors and based on this, a fault finding diagram for flash programming is shown below. Various errors can appear from the prommer when flashing the phone - not all of them can be directly linked to the HW or phone.

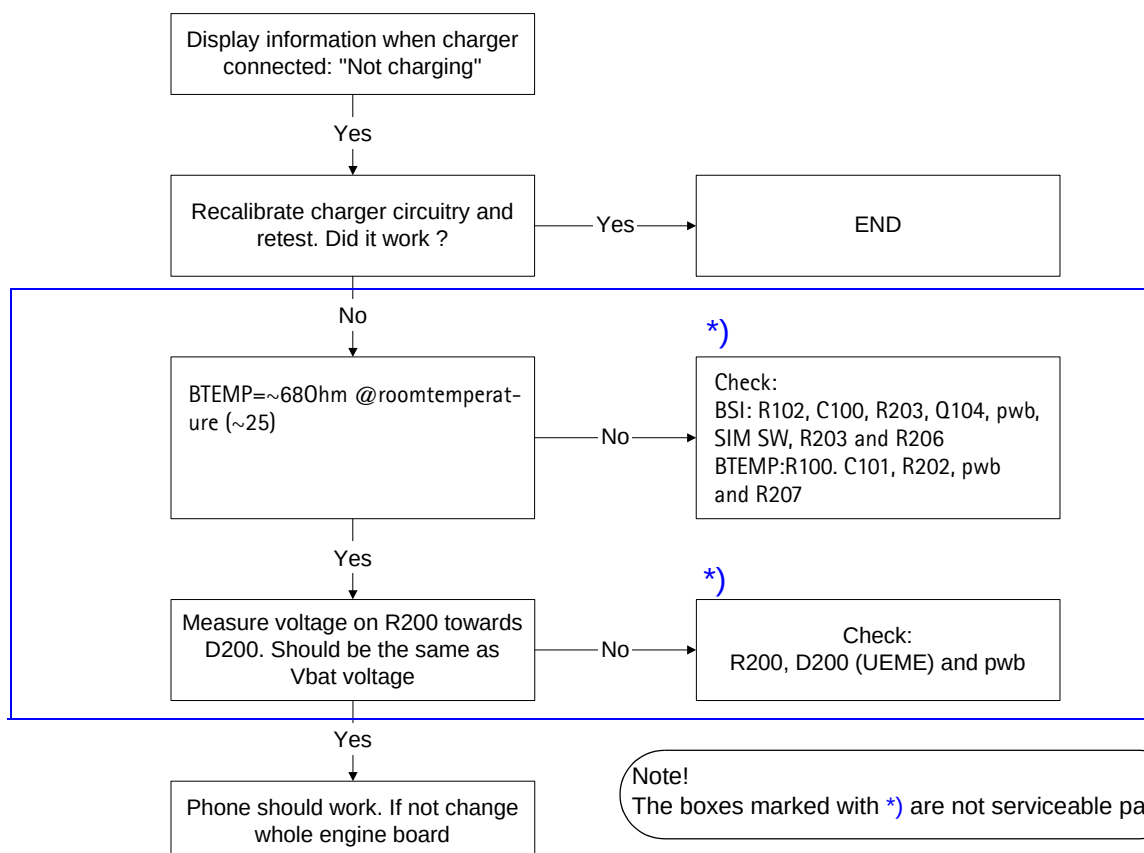
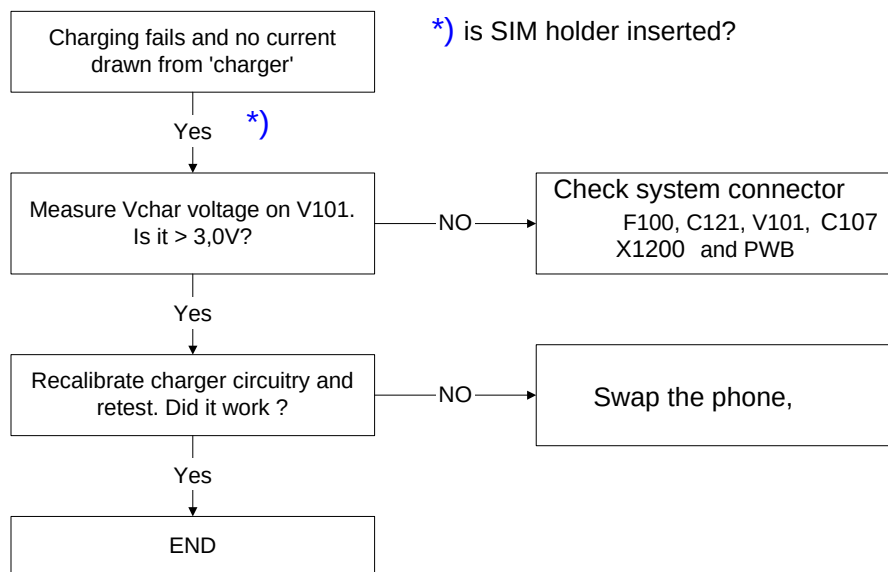
Because of the use of uBGA components, it is not possible to verify on the diagram, if there is a short circuit in control and address/data lines on TIKUEDGE, NOR flash, NAND flash or SDRAM.

Figure 3:Flash programming does not work



■ Charging failure

Figure 4: Troubleshooting charging



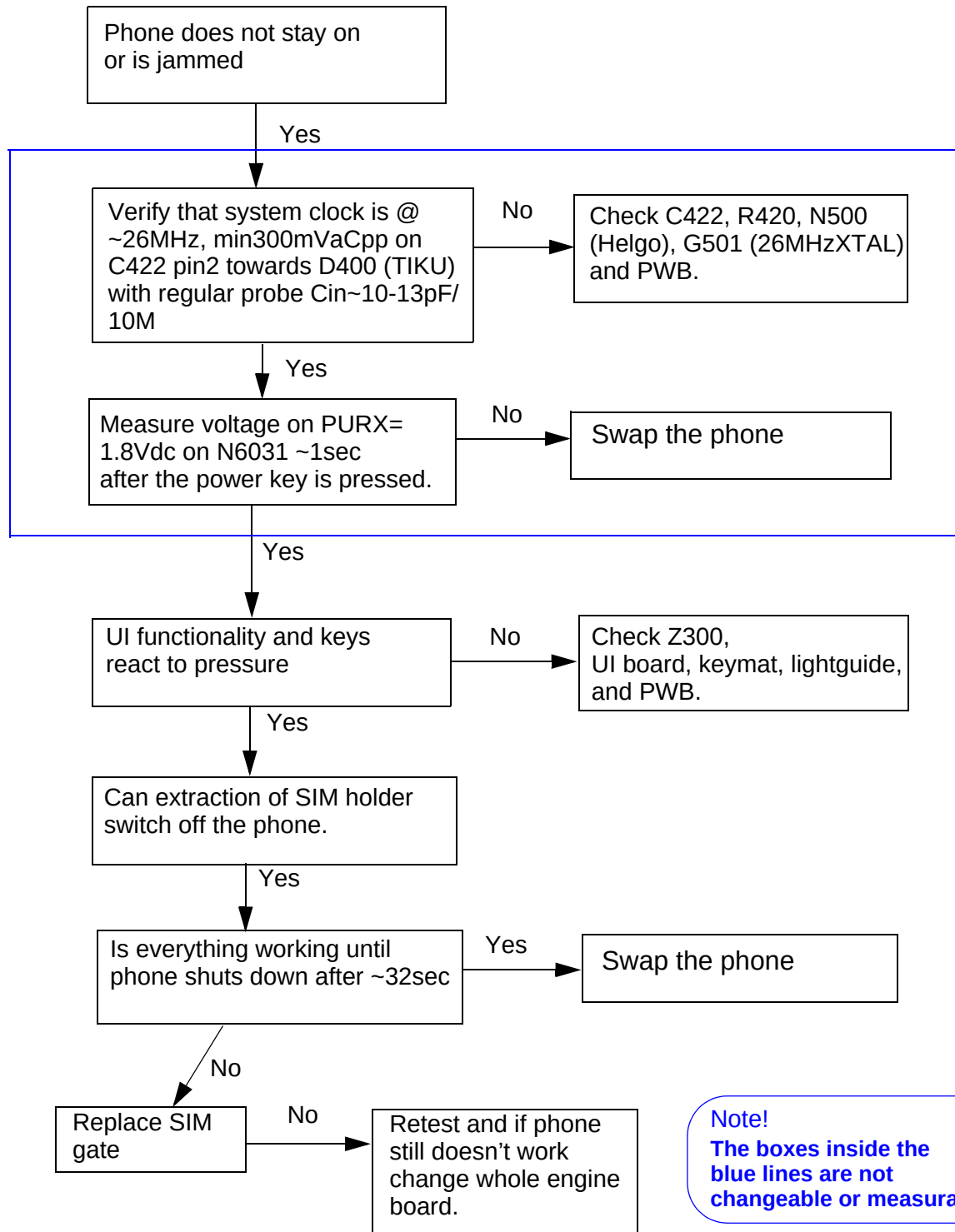
Note!
The boxes marked with *) are not serviceable parts!

The boxes inside the blue lines
are not changeable or measurable!

■ Phone does not stay on, or phone is jammed

If the MCU doesn't service the watchdog register within the UEME, the operations watchdog will run out after approximately 32 seconds. It is not possible to measure this service routine.

Figure 5: Phone does not stay on, or is jammed



■ Display information: “Contact Service”

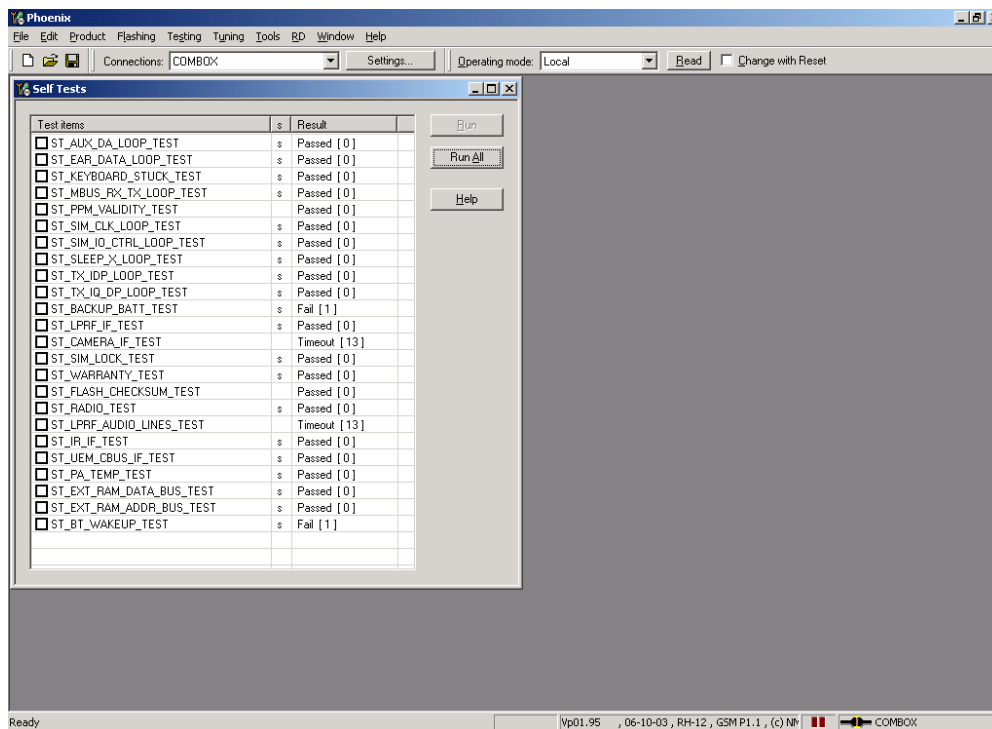
When this error appears in the display it means that one or more of the internal baseband tests has failed. The baseband tests (self tests) are performed each time the phone is powered on. The self tests are divided into those performed while powering up (Start up tests) and the ones that can be executed with a PC using Phoenix (Runtime tests). The following Start-up tests are performed during power up:

UEM CBUS IF TEST
SLEEP X LOOP TEST
AUX DA LOOP TEST
EAR DATA LOOP TEST
TX IDP LOOP TEST
TX IQ DP LOOP TEST
SIM CLK LOOP TEST
SIM IO CTRL LOOP TEST
MBUS RX TX LOOP TEST
BACKUP BATT TEST
RADIO TEST
WARRANTY TEST
PA TEMP TEST
SIM LOCK TEST
PPM VALIDITY TEST
KEYBOARD STUCK TEST
LPRF IF TEST
FLASH CHECKSUM TEST
CAMERA IF TEST
EXT RAM DATA BUS TEST
EXT RAM ADDR BUS TEST
NAND FLASH ID TEST
BT WAKEUP TEST
IR IF_TEST

If all these self tests are passed, the phone will start up.

From Phoenix it's possible to run all the self tests and the additional “Runtime test”. The test cases can be seen below.

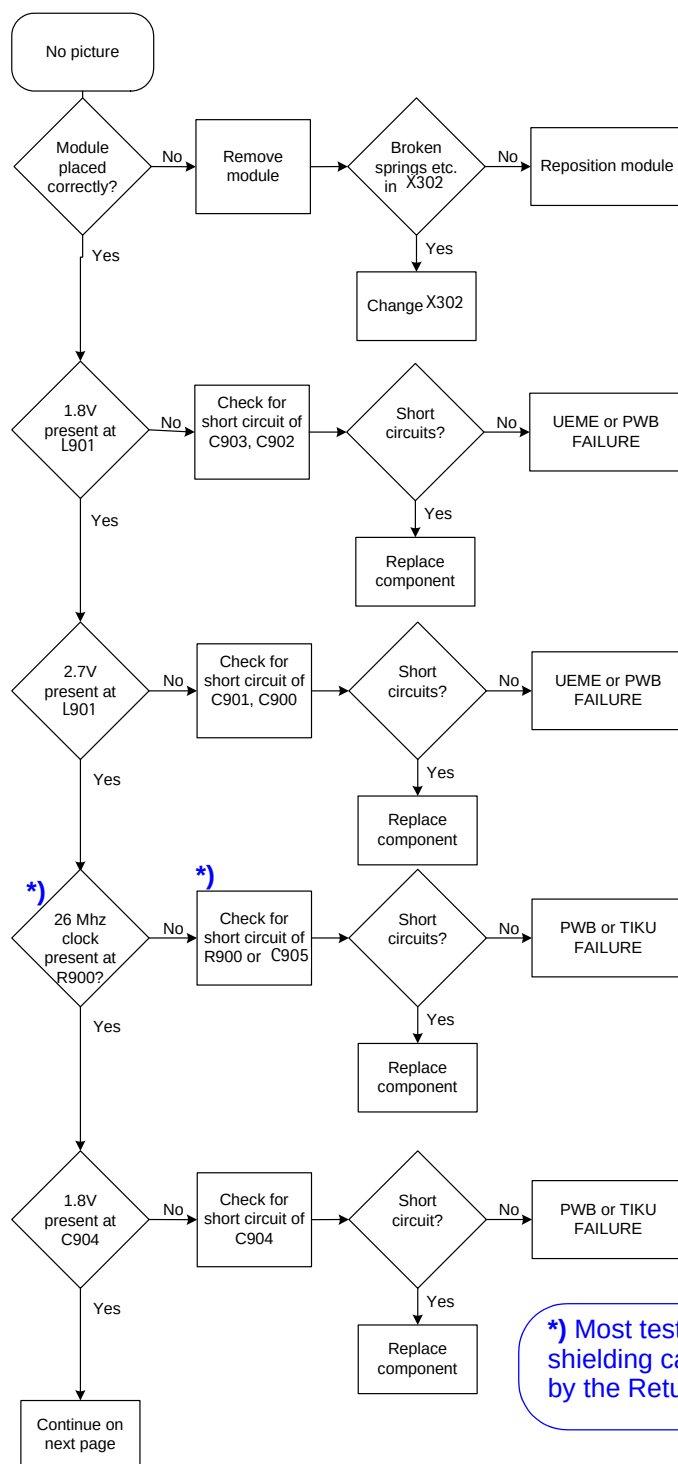
Figure 6: Display information: "Contact Service"



Function Failures

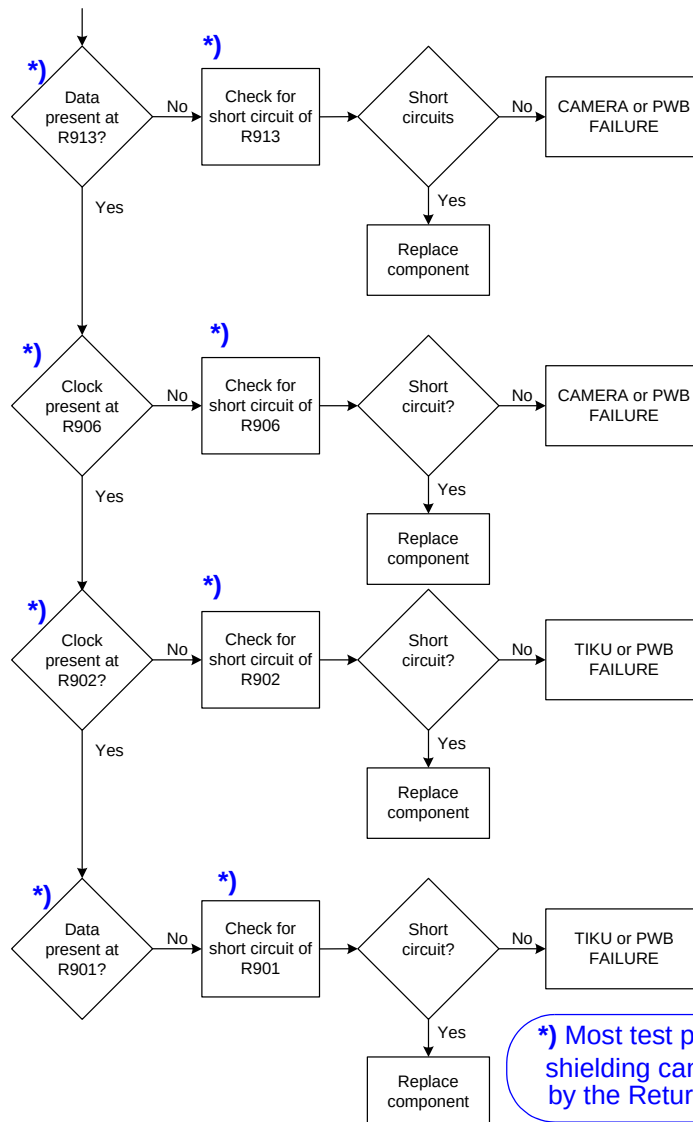
■ Camera failure

Figure 7: No picture

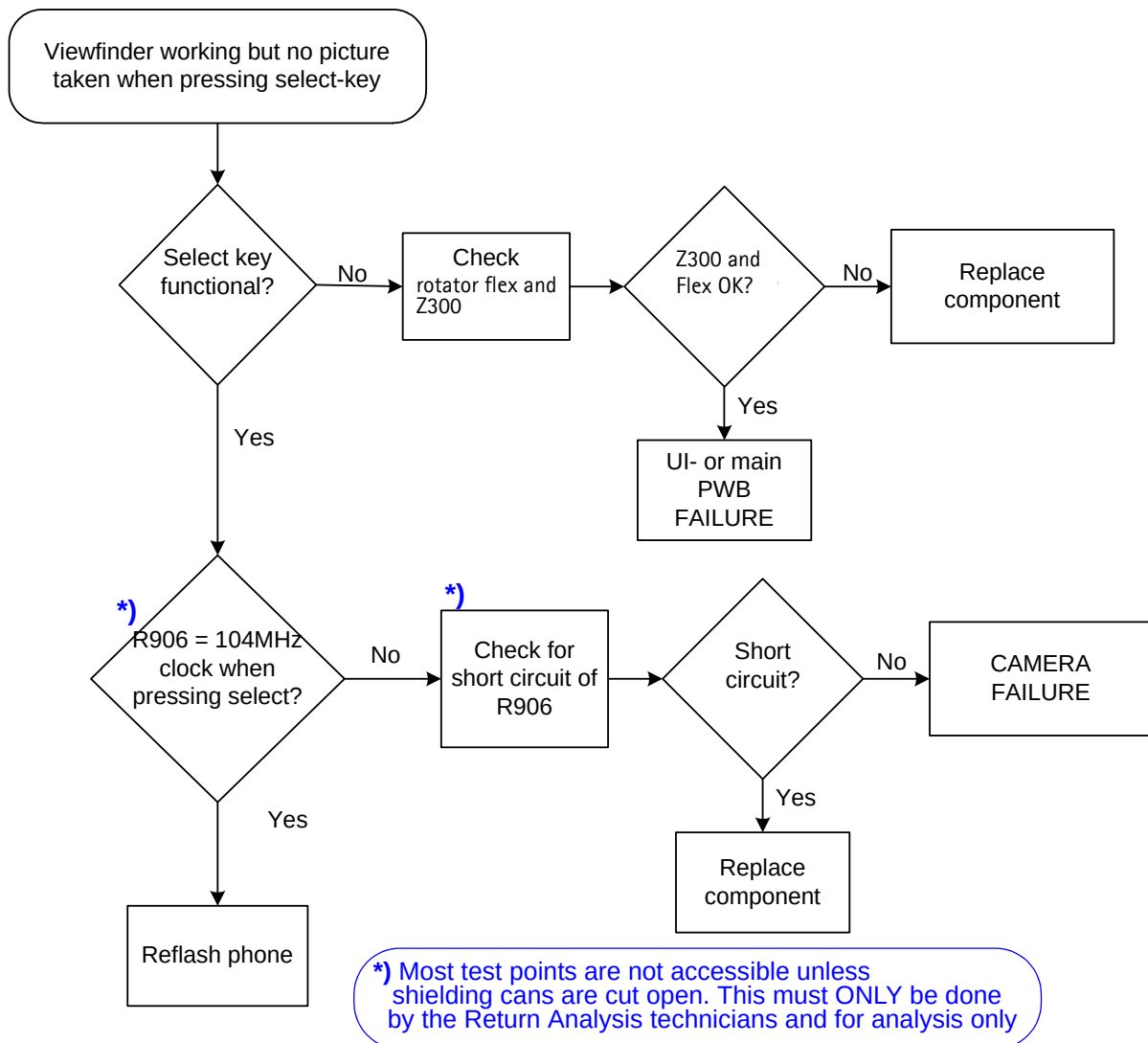


*) Most test points are not accessible unless shielding cans are cut open. This must ONLY be done by the Return Analysis technicians and for analysis only

Figure 8:No picture 2



*) Most test points are not accessible unless shielding cans are cut open. This must ONLY be done by the Return Analysis technicians and for analysis only

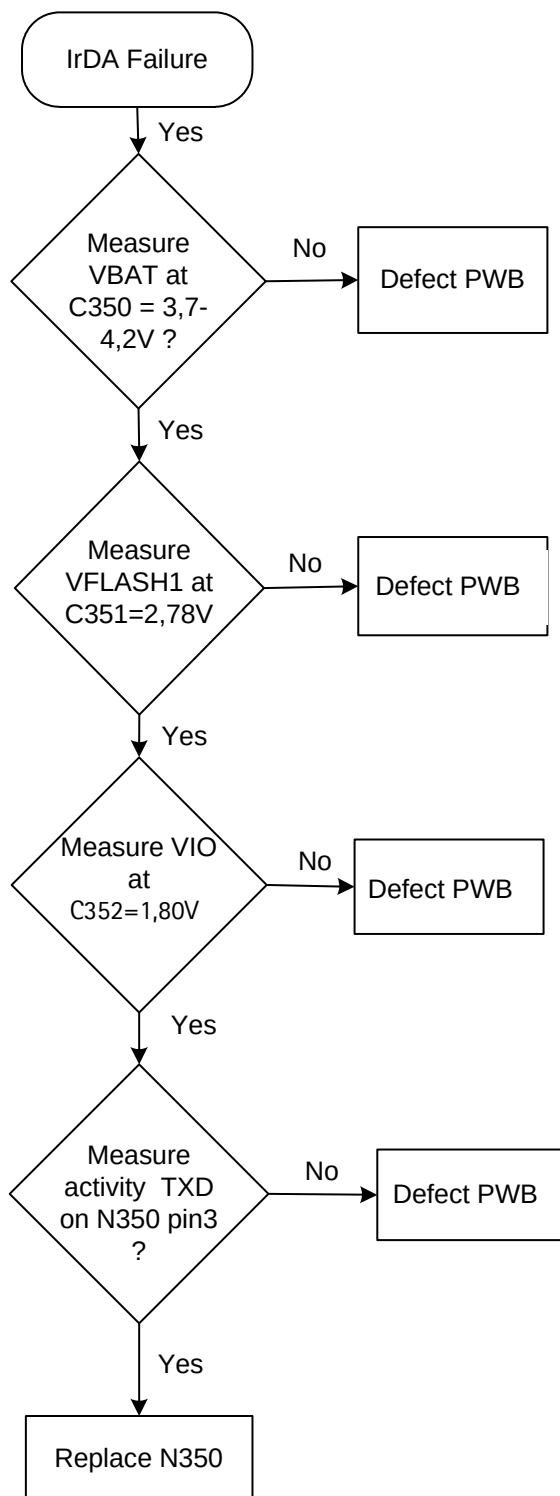
*Viewfinder working but no picture taken when pressing select-key***Figure 9: Viewfinder working but no picture taken when pressing select-key**

■ FM-radio failure

The FM-radio troubleshooting guide is placed in the RF section.

■ Infrared communication failure

Figure 10: Infrared communication failure

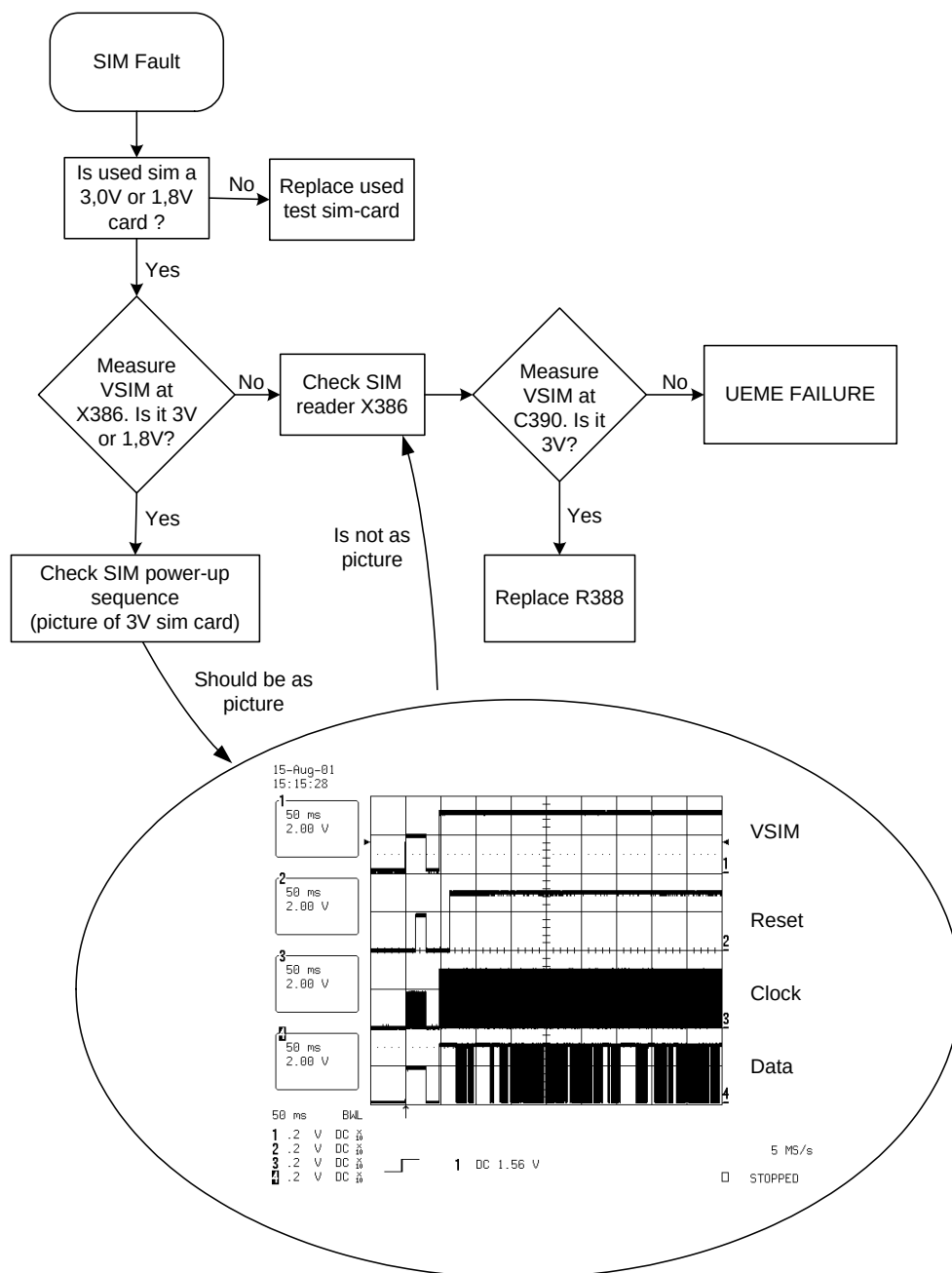


■ SIM failure

The hardware of the SIM interface from the UEME (D200) to the SIM connector (X386) can be tested without a SIM card. When the power is switched on, the phone first checks for a 1,8V SIM card and then a 3V SIM card. The phone will try this four times, whereafter it will display "Insert SIM card".

The error "SIM card rejected" means that the ATR message received from the SIM card is corrupted, e.g. data signal levels are wrong. The first data is always ATR and it is sent from card to phone.

Figure 11:SIM failure

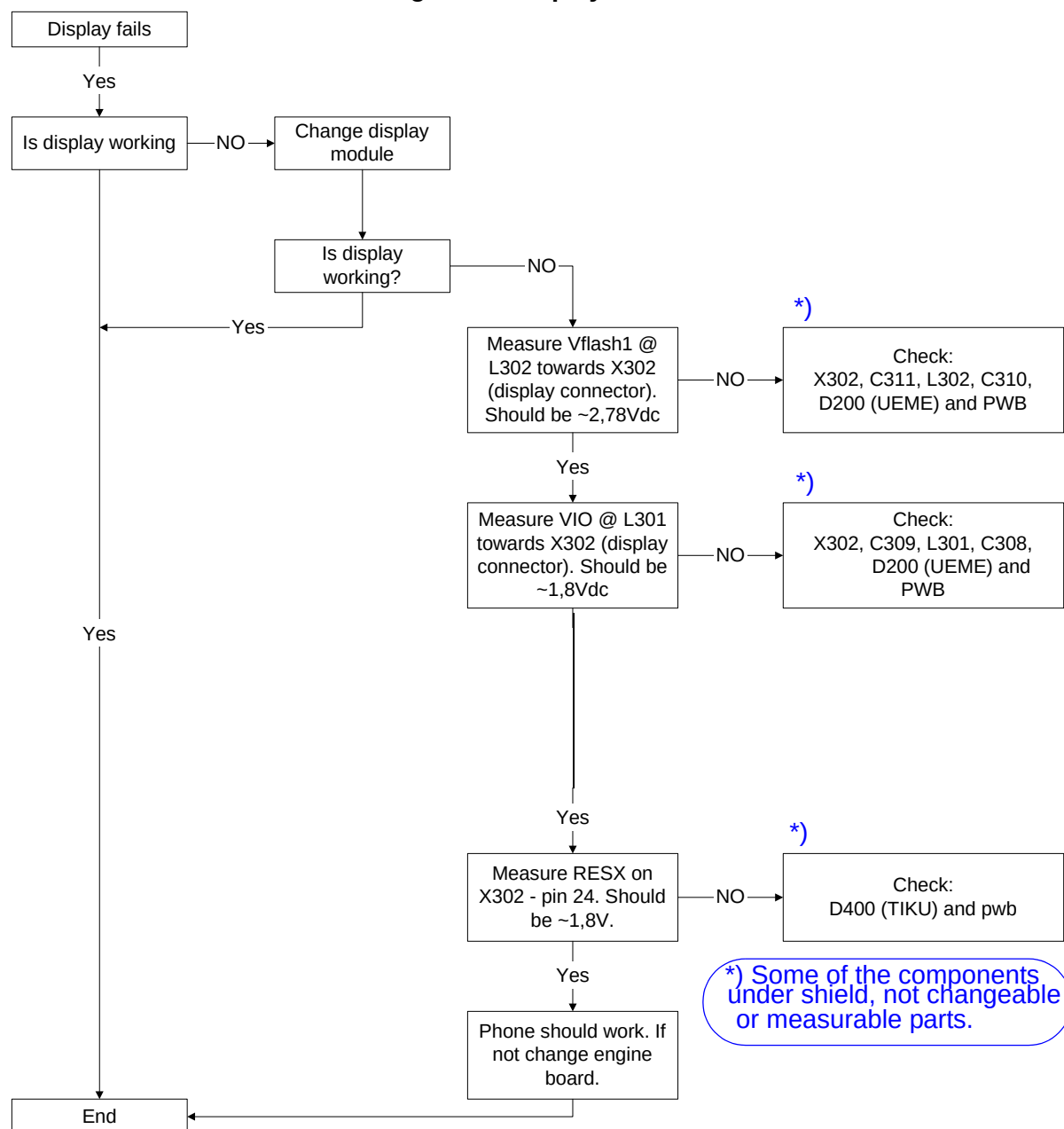


■ Bluetooth failure

The Bluetooth troubleshooting guide is placed in the RF section.

■ Display failure

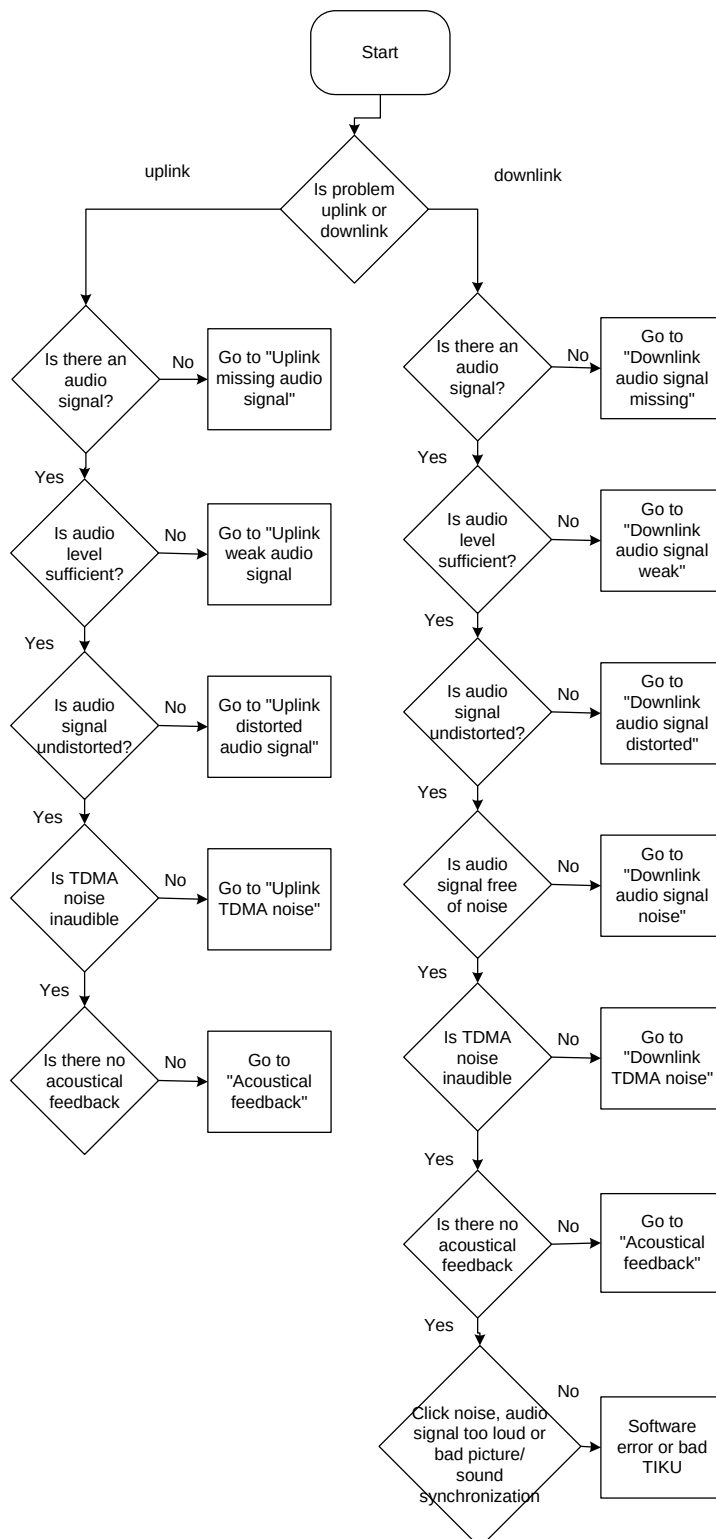
Figure 12: Display failure

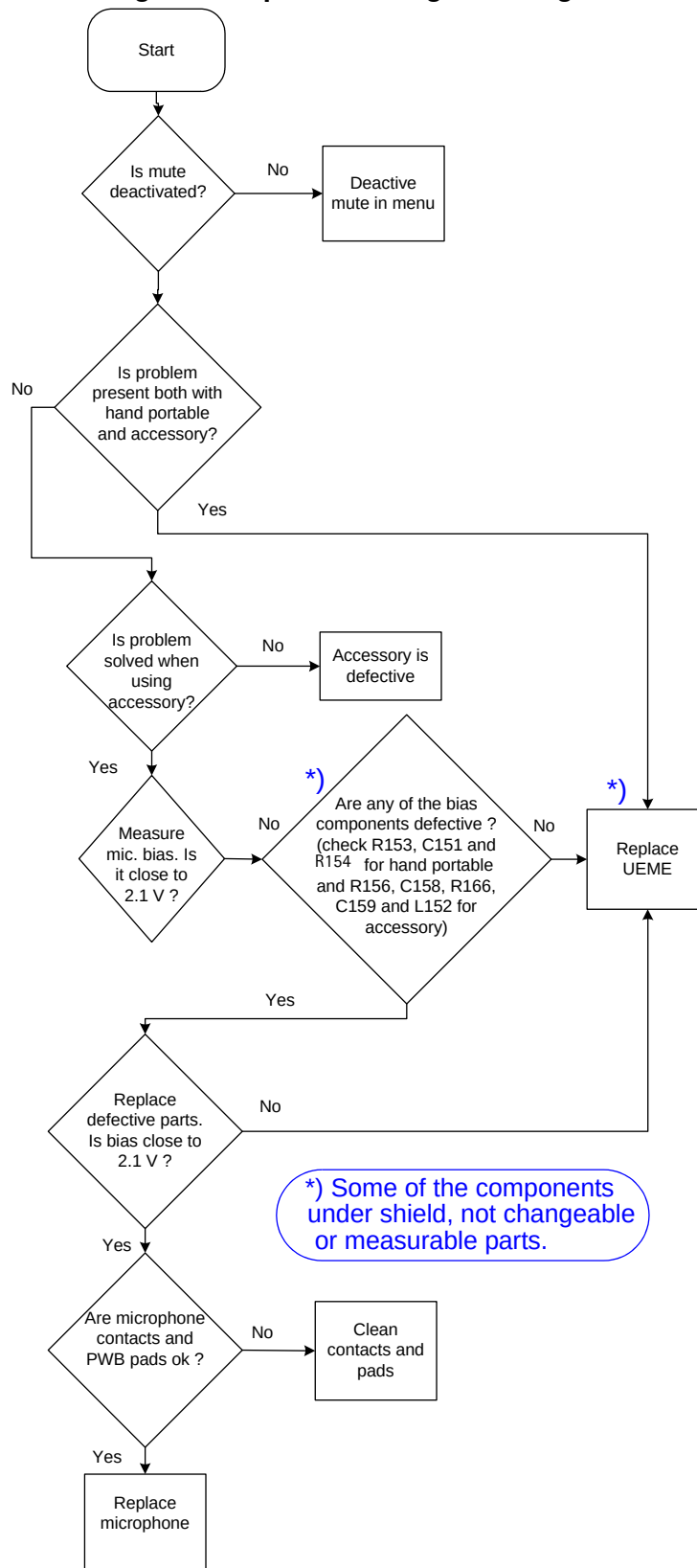


■ Audio failure

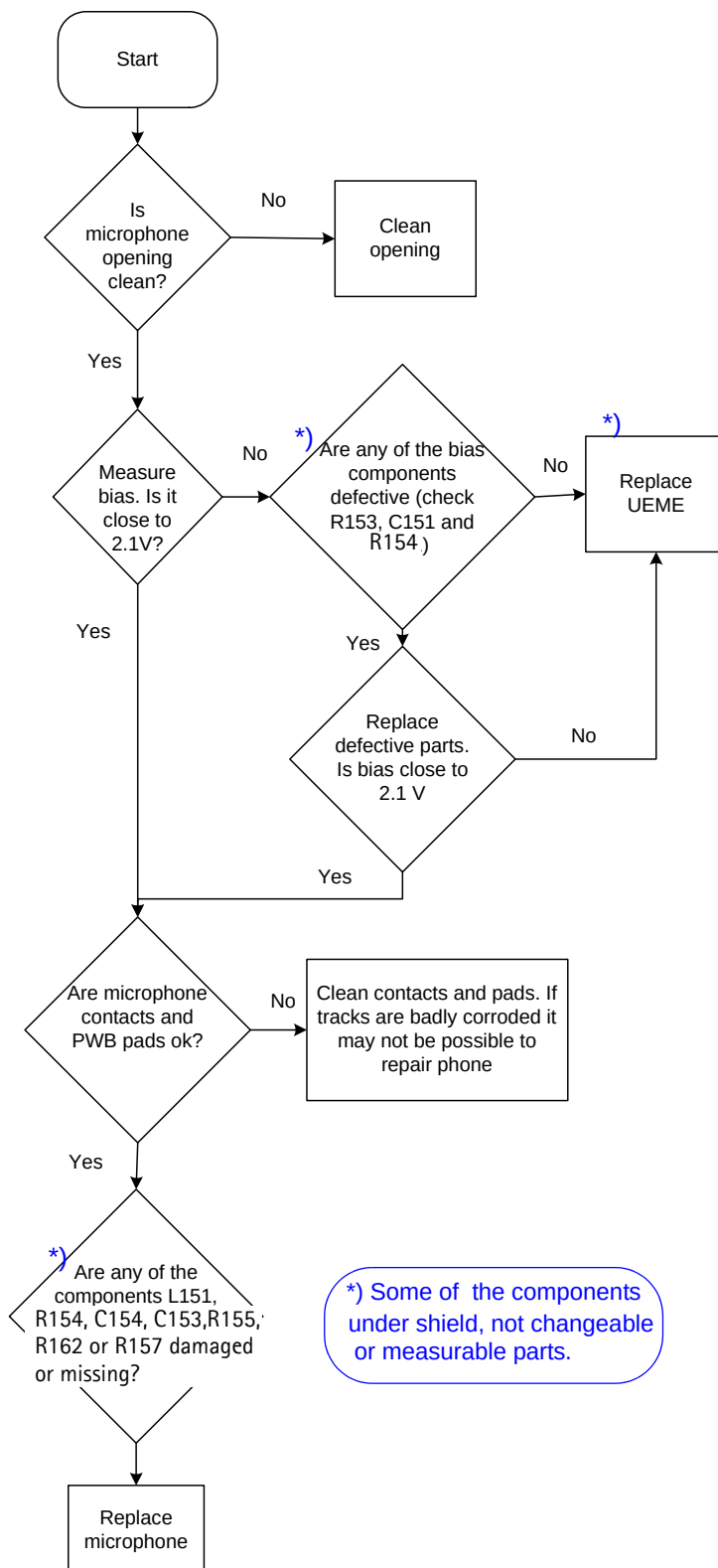
Uplink or downlink failure

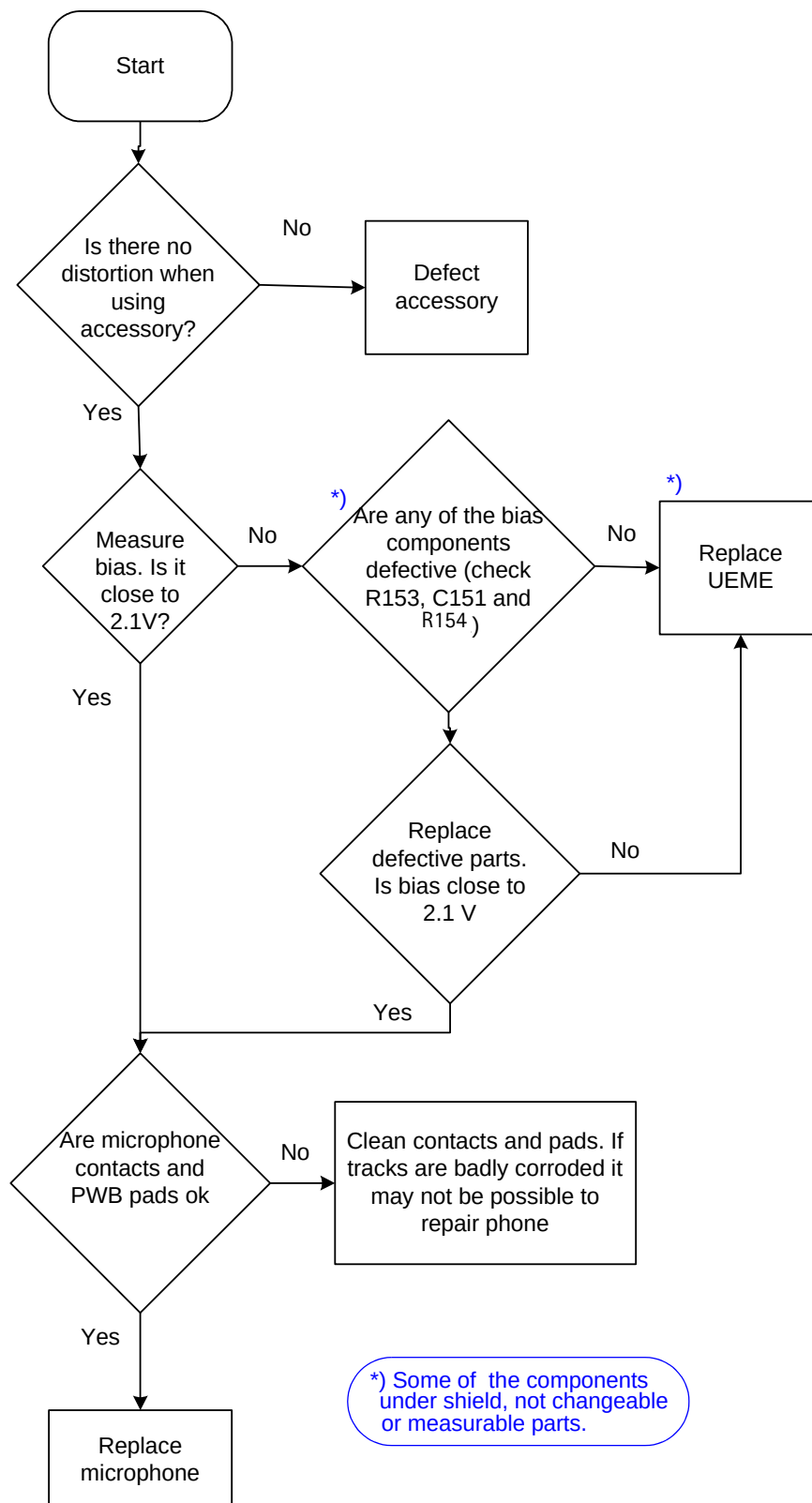
Figure 13:Uplink or downlink failure

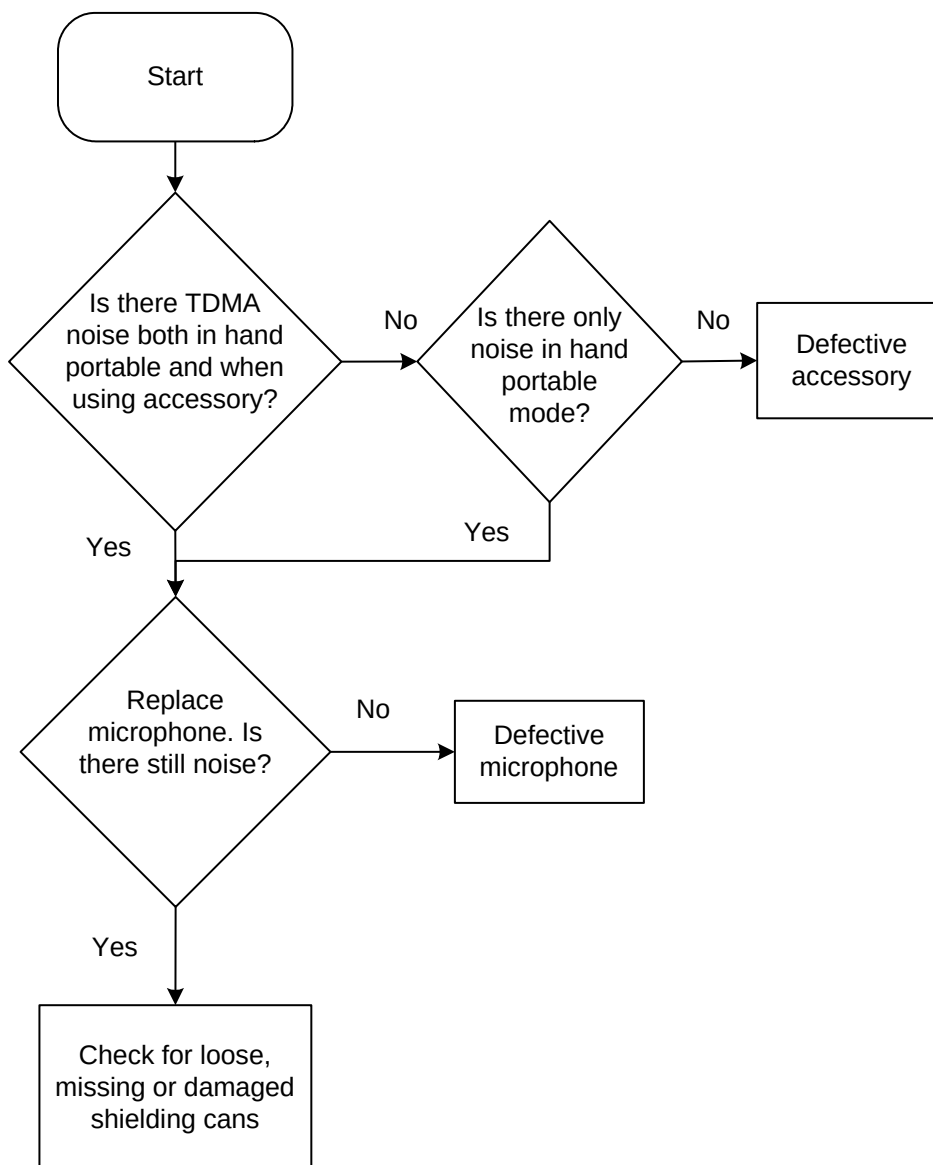


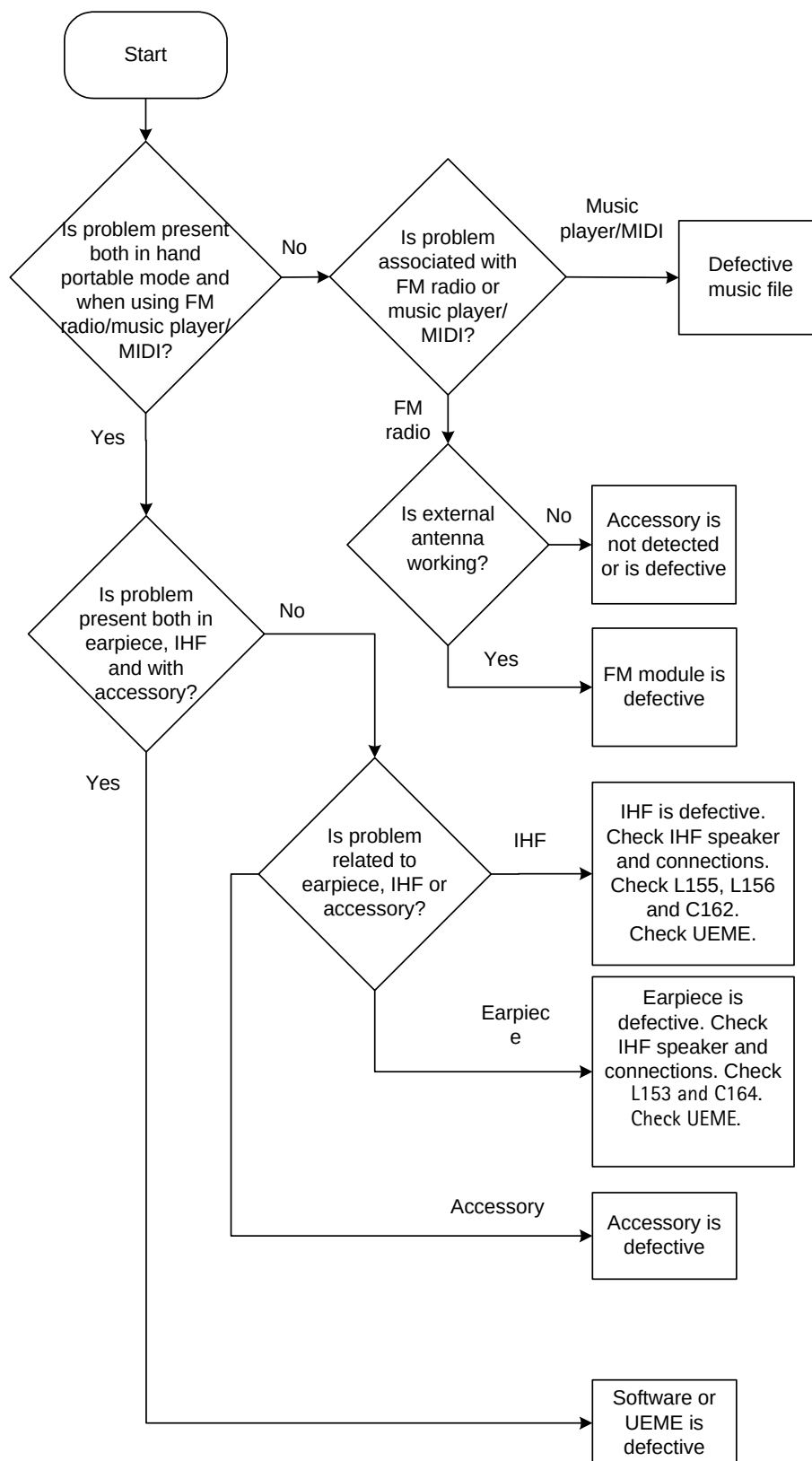
*Uplink missing audio signal***Figure 14:Uplink missing audio signal**

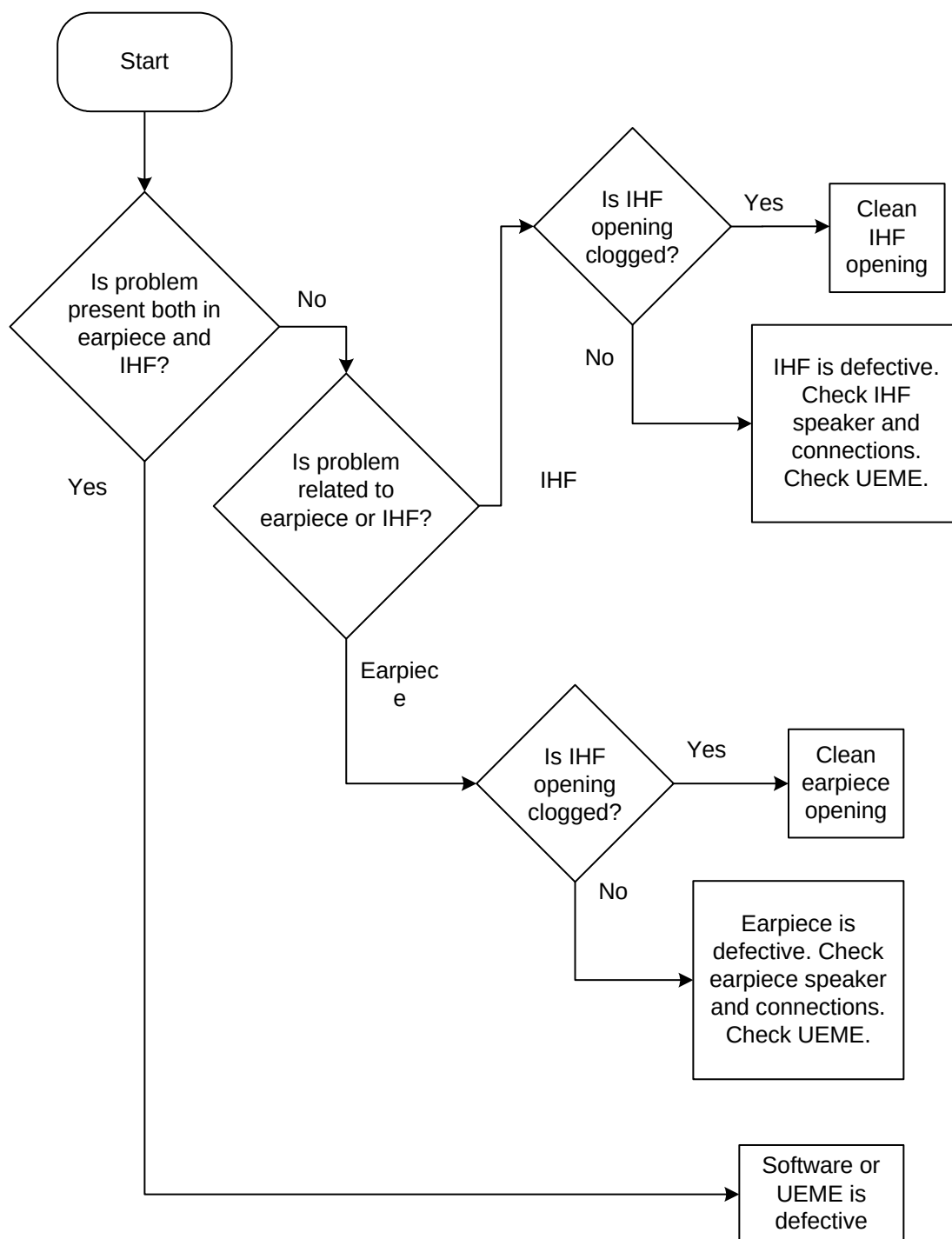
*) Some of the components under shield, not changeable or measurable parts.

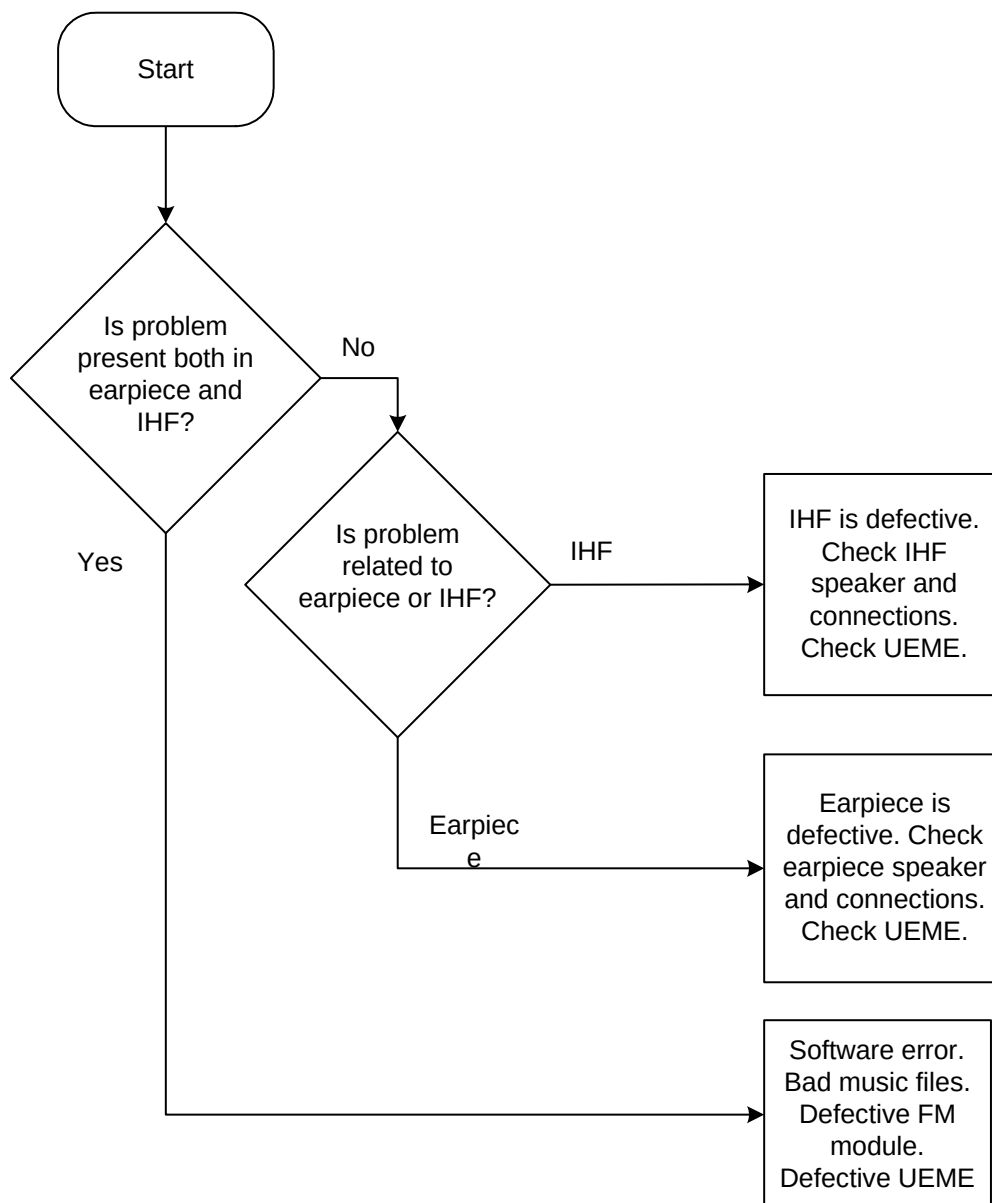
*Uplink weak audio signal***Figure 15:Uplink weak audio signal**

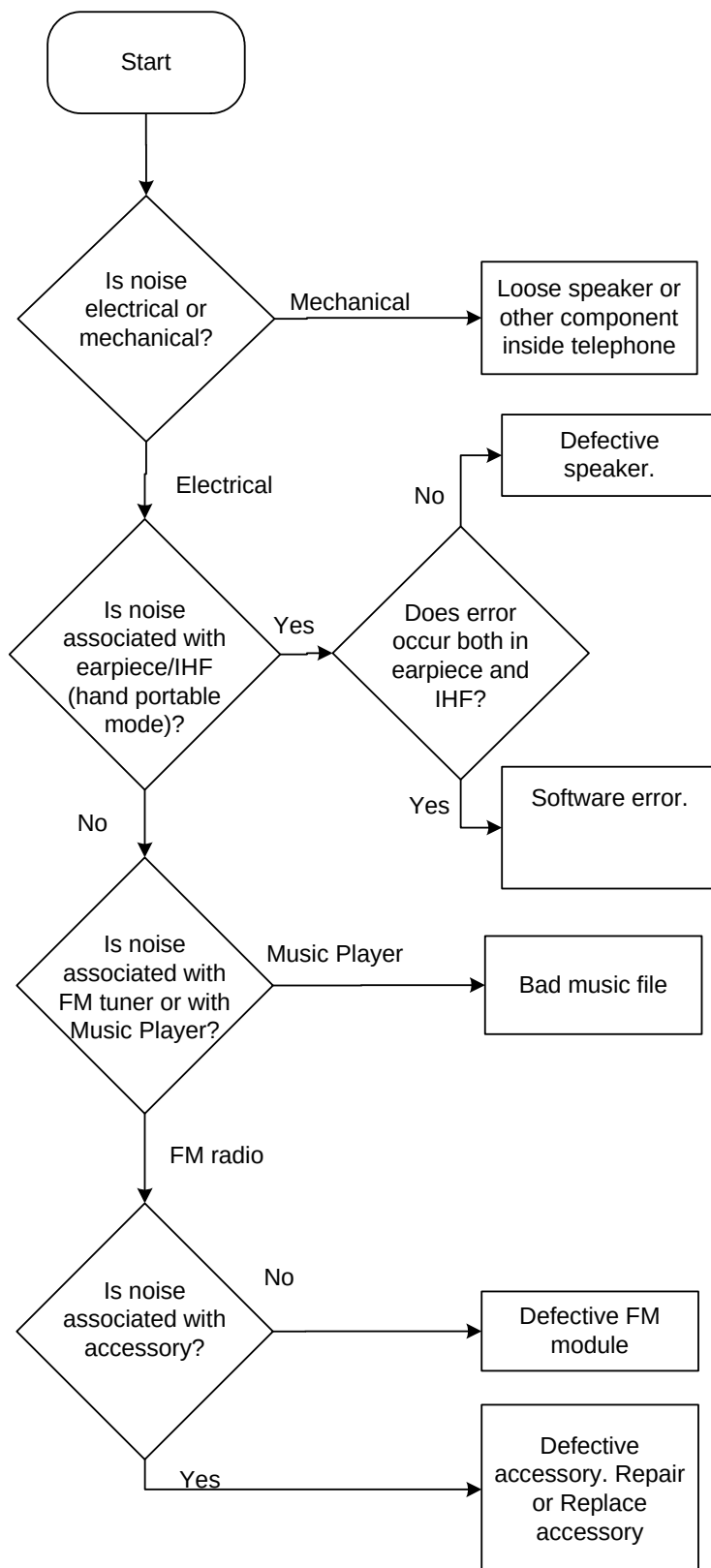
*Uplink distorted audio signal***Figure 16:Uplink distorted audio signal**

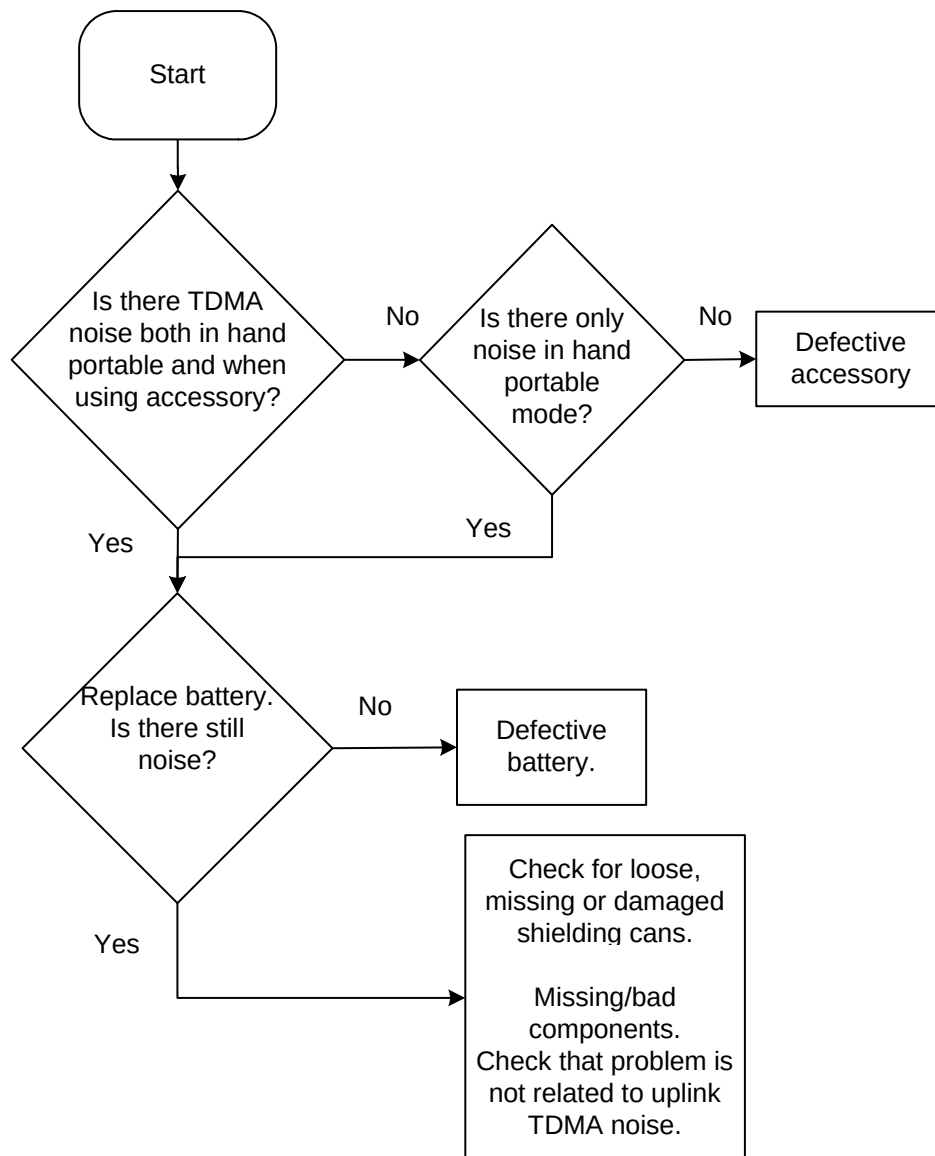
*Uplink TDMA noise***Figure 17:Uplink TDMA noise**

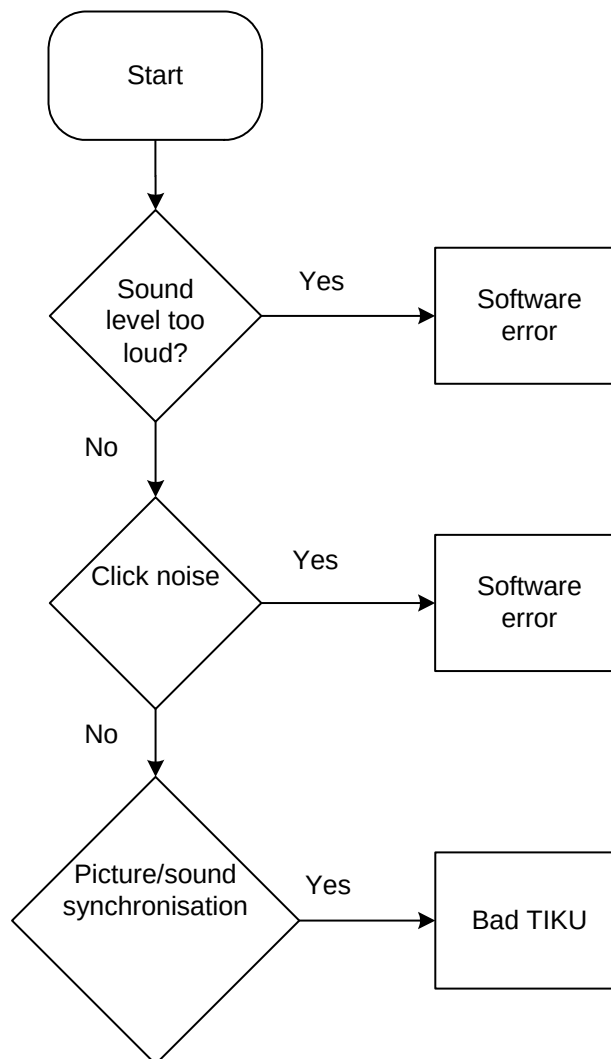
*Downlink missing audio signal***Figure 18:Downlink missing audio signal**

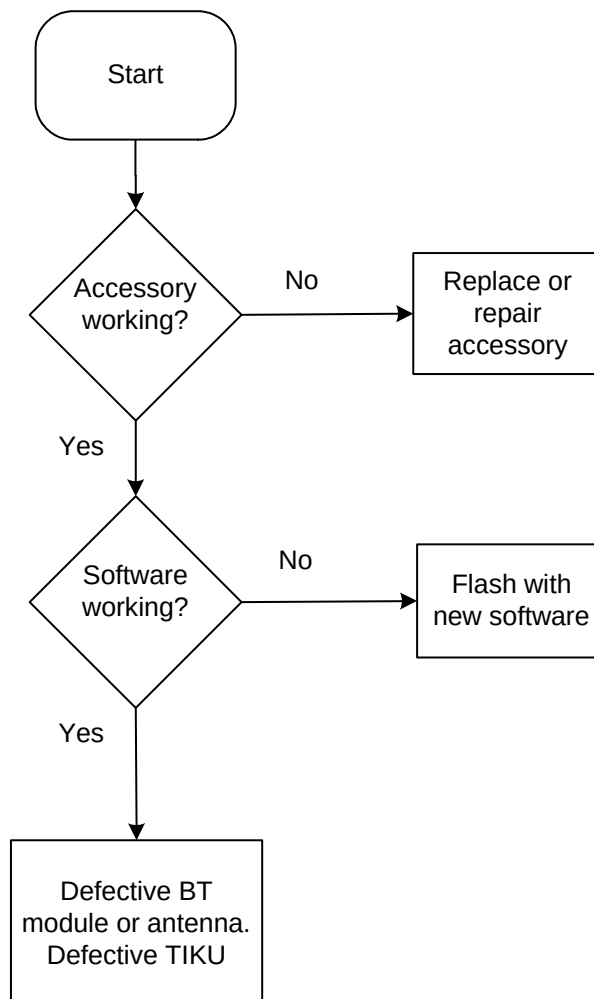
*Downlink weak audio signal***Figure 19: Downlink weak audio signal**

*Downlink distorted audio signal***Figure 20:Downlink distorted audio signal**

*Downlink noise in audio signal***Figure 21:Downlink noise in audio signal**

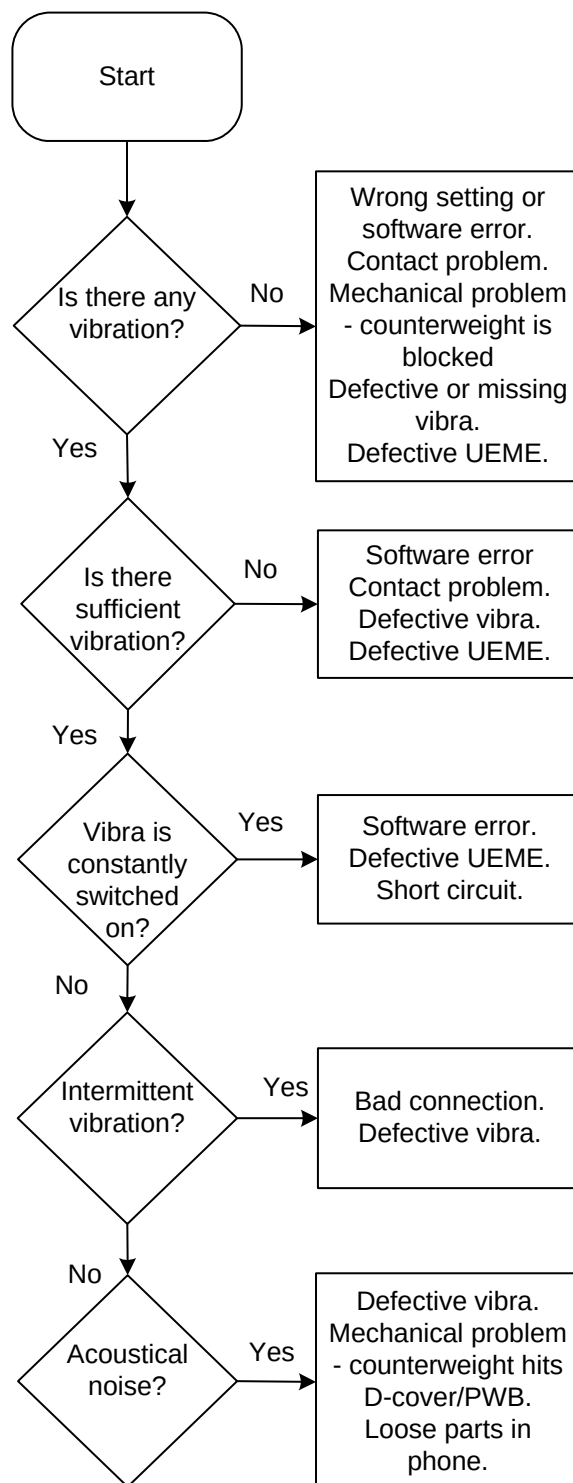
*Downlink TDMA noise***Figure 22:Downlink TDMA noise**

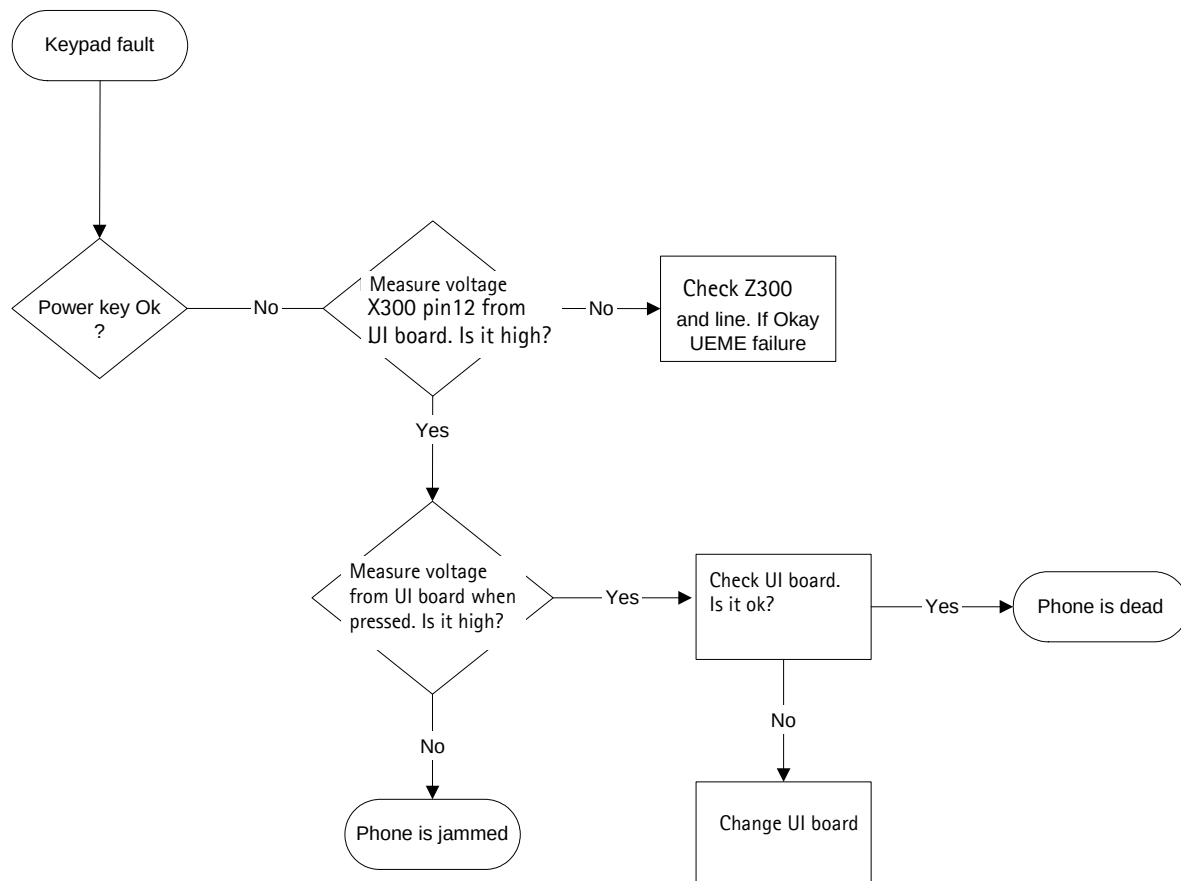
*Various noise problems***Figure 23: Various noise problems**

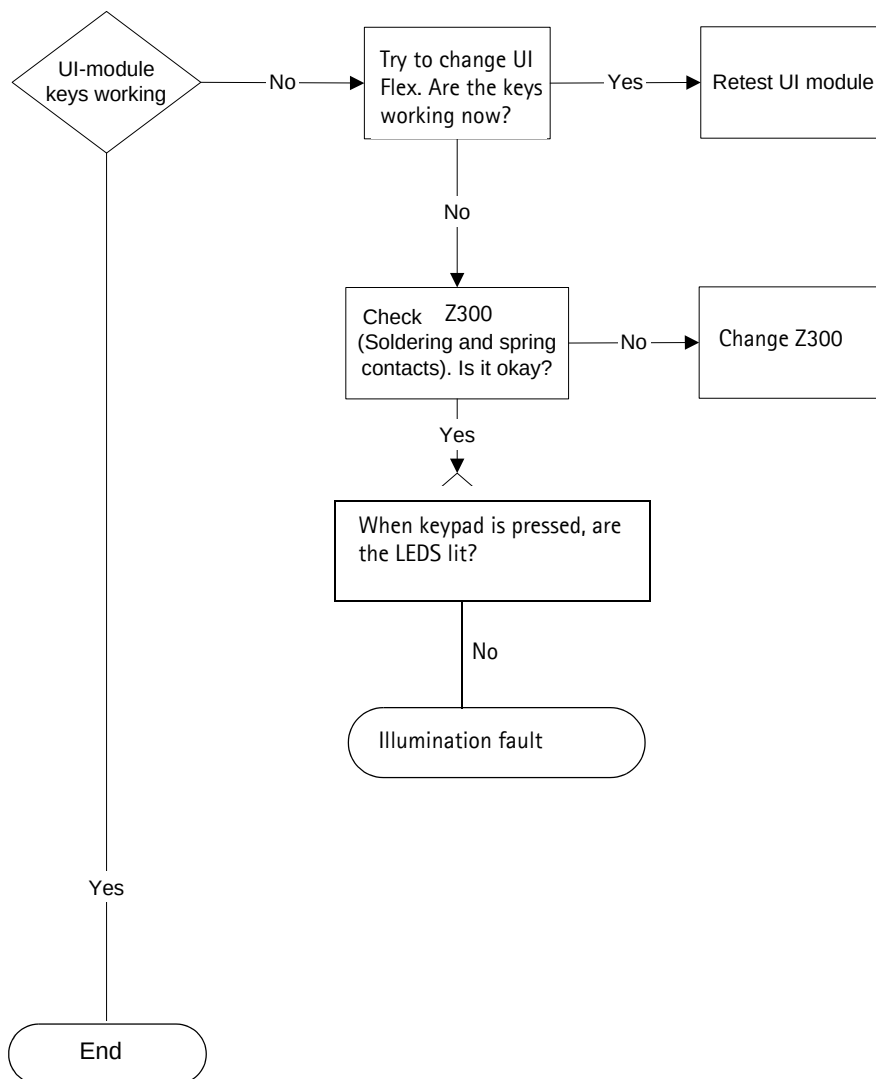
*BT audio errors***Figure 24:BT audio errors**

Vibra errors

Figure 25:Vibra errors



■ Key failure*Power key failure***Figure 26:Power key failure**

*UI module keys working***Figure 27: UI module keys working**

Service Tool Concept for RM-14 Baseband Tunings

EM calibrations should be carried out in JBV-1 Docking Station equipped with DA-40 Docking Station Adapter

Note: RF tunings must be carried out in MJ-12 module jig.

Power to JBV-1 should be supplied from an external DC power supply, not FPS-8 prommer JBV-1 input voltages:

- Maximum + 16 VDC
- Nominal input for RF tunings is +12 V DC

■ Service concept for RM-14 baseband tunings

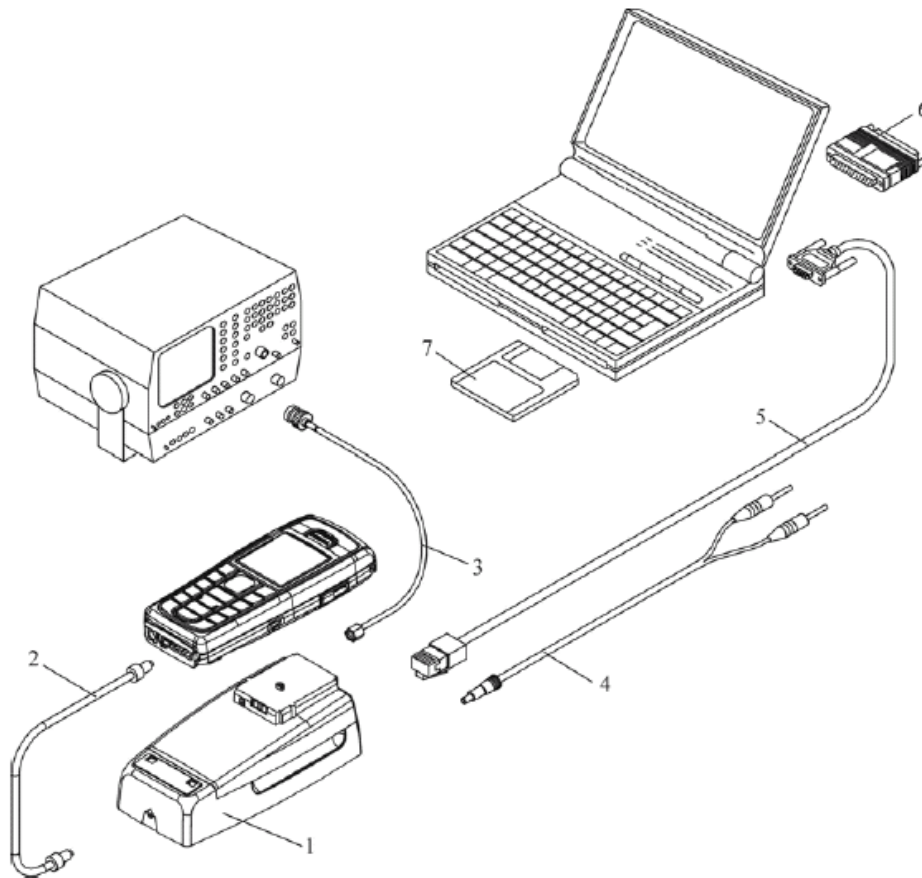


Table 1:

Item	Type	Description	Product code
1	JBV-1	Docking Station	0770298
2	DA-40	Docking station adapter	0780380
4	CA-5S	DC-DC cable	0730283
5	XRF-1	RF antenna cable	0730085
6	PCS-1	DC power cable	0730012
7	DAU-9S	Service MBUS cable	0730108
8	PKD-1	Software protection key	0750018
9		Phoenix service SW	8408031

Table 1:

Item	Type	Description	Product code
9	CD-ROM	Phoenix service SW	0774286

Baseband Tunings

■ Energy management tuning

External power supply is needed.

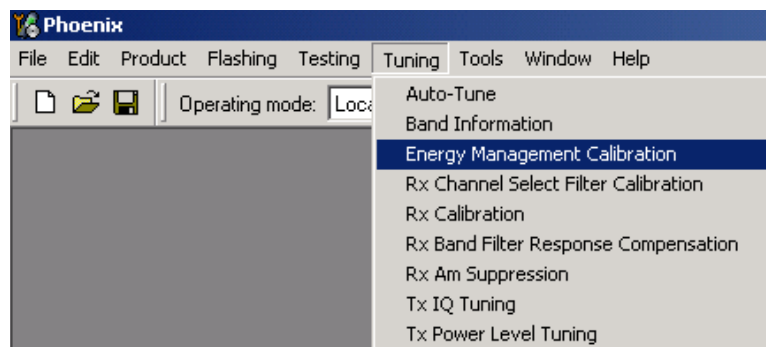
EM Calibration is used for calibrating Battery and Charger settings of the phone.

Preparation for EM Calibration:

- Connect DC Cable CA-5S between JBV-1 and Vin of Phone for Charger calibration.
- Connect 12...15 V from Power Supply to JBV-1.

NOTE! Check that connection is F-BUS (doesn't work with M-BUS!).

Select **Tuning => Energy Management Calibration**



Energy Management values to be calibrated are checked.

Select "**Read from Phone**" to show current values in the phone memory and to check that the communication with the phone works.

Select **“Calibrate”** to run selected calibrations.

	Calibrated	Phone Values
ADC Offset [mV]		
ADC Gain [0.0001 mV/bit]		
☒ Battery Size BSI Gain [100 Ohm]		
☐ Battery Temperature BTEMP Gain		
☒ Battery Voltage SCAL Offset [mV]		
☒ Charger Voltage VCHAR Gain		
☒ Charge Current ICHAR Offset		
☐ Battery Current IBAT Gain		

Status:

Limits for Energy Management Calibration:

Min Max

ADC gain 27000 28000

ADC offset -50 50

BSI gain 930 1100

VBAT gain 10000 11000

VBAT offset 2400 2600

VCHAR 58000 62000

ICHAR 3500 4600

If values shown are within limits, select **“Save To Phone”** to save values to phone.

NOTE! Only values of checked tunings (Battery size, Battery Temperature etc...) will be saved.

Close the **“Energy Management Calibration”** dialog to end tuning.

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